componential force may not sufficiently be detected. In addition, when the signals to be input to the respective fixed electrodes contain noises, the sensor may erroneously operate because an erroneous output signal is detected.

Therefore, a principal object of the present invention is to provide a capacitance type sensor superior in sensitivity characteristic and hard to be influenced by noise.

Disclosure of the Invention

A capacitance type sensor of the present invention is characterized in that the sensor comprises a substrate that provides an XY plane of an XYZ three-dimensional

characteristics.

In this feature of the present invention, because a threshold value for an input signal increasing and a threshold value for the input signal decreasing are different from each other in the signal processing circuit having the hysteretic characteristics, a change in an output signal corresponding to a change in the capacitance value of the first capacitance element is wider. Thus, the sensitivity characteristic of the sensor is improved in comparison with a case wherein the output signal is detected by a signal processing circuit having no hysteretic characteristics.

In addition, even when an input signal contains noise, because the threshold value for the input signal increasing and the threshold value for the input signal decreasing are different from each other, it is suppressed to detect an erroneous output signal. Thus, an erroneous operation of the sensor under the influence of the noise can be prevented.

In addition, the conductive member used in common to form the first and second capacitance elements is electrically connected to the reference electrode being kept at the ground or other fixed potential, not by direct contact but by capacitance coupling. Thus, the

withstand voltage characteristic of the sensor is improved and the sensor is scarcely broken by a spark current flowing, and in addition, inconvenience such as badness in electrical connection can be prevented. Thus, a highly reliable capacitance type sensor can be obtained. In addition to that, because the first and second capacitance elements are connected in series, there is no need of separately providing wiring for keeping the conductive member at the ground or other fixed potential if wiring is provided only on a member such as a substrate supporting the capacitance element electrode and the reference electrode. Thus, a capacitance type sensor simple in construction can be manufactured in a small number of manufacturing steps.

In the capacitance type sensor of the present invention, the capacitance element electrode may include a pair of first capacitance element electrodes disposed symmetrically with respect to a Y axis, a pair of second capacitance element electrodes disposed symmetrically with respect to an X axis, and a third capacitance element electrode disposed near an origin.

In this feature of the present invention, the sensor can separately detect X-axial, Y-axial, and Z-axial components of an external force received by the

detective member. The third capacitance element electrodes may not be used for detecting Z-axial components, and may be used for operation for determination of an input.

CLAIMS

1. (deleted)

2. (deleted)

3. A capacitance type sensor characterized in that the sensor comprises:

a substrate that provides an XY plane of an XYZ three-dimensional coordinate system defined;

a detective member being opposed to the substrate;

a conductive member disposed between the substrate and the detective member so as to be Z-axially displaceable in accordance with Z-axial displacement of the detective member;

a capacitance element electrode formed on the substrate to cooperate with the conductive member to form a first capacitance element; and

a reference electrode formed on the substrate to cooperate with the conductive member to form a second capacitance element, and kept at a ground potential or another fixed potential;

the first and second capacitance elements are connected in series in relation to a signal input to the capacitance element electrode, and displacement of the detective member can be detected on the basis of detection of a change in the capacitance value of the first capacitance element caused by a change in the interval between the conductive member and the

capacitance element electrode; and

the sensor comprises two capacitance element electrodes in a pair, and output signals corresponding to signals input to a circuit including one of the capacitance element electrodes and a circuit including the other of the capacitance element electrodes, respectively, are detected by a signal processing circuit having hysteretic characteristics.

4. The capacitance type sensor according to claim 3, characterized in that the capacitance element electrode includes a pair of first capacitance element electrodes disposed symmetrically with respect to a Y axis, a pair of second capacitance element electrodes disposed symmetrically with respect to an X axis, and a third capacitance element electrode disposed near an origin.

5. (amended) The capacitance type sensor according to claim 3 or 4, characterized in that a threshold value of the signal processing circuit for an input signal increasing is higher than a threshold value of the signal processing circuit for the input signal decreasing.

6. (amended) The capacitance type sensor according to any of claims 3 to 5, characterized in that a Schmitt trigger type logic element is utilized in the signal processing circuit.

7. The capacitance type sensor according to claim 6, characterized in that the Schmitt trigger type logic element performs an exclusive OR operation.

8. The capacitance type sensor according to claim 6, characterized in that the Schmitt trigger type logic element performs an OR operation.

9. The capacitance type sensor according to claim 6, characterized in that the Schmitt trigger type logic element performs an AND operation.

10. The capacitance type sensor according to claim 6, characterized in that the Schmitt trigger type logic element performs a NAND operation.

11. (amended) The capacitance type sensor according to any of claims 3 to 5, characterized in that a Schmitt trigger type buffer element is utilized in the signal processing circuit.

12. (amended) The capacitance type sensor according to any of claims 3 to 5, characterized in that a Schmitt trigger type inverter element is utilized in the signal processing circuit.

13. (amended) The capacitance type sensor according to any of claims 3 to 5, characterized in that a hysteresis comparator is utilized in the signal processing circuit.

14. (amended) The capacitance type sensor according to any of claims 3 to 13, characterized in that signals different from each other in phase are supplied to the circuit including one of the capacitance element electrodes and the circuit including the other of the capacitance element electrodes.

15. (amended) The capacitance type sensor according to any of claims 3 to 14, characterized in that a CR circuit including one of the capacitance element electrodes and another CR circuit including the other of the capacitance element electrodes are different from each other in time constant.

16. (amended) The capacitance type sensor according to any of claims 3 to 15, characterized in that the signal is a signal in which a high level and a low level are periodically repeated, and the sensor further comprises a control element having a function of discharging the first capacitance element when the signal is at the low level.

17. The capacitance type sensor according to claim 16, characterized in that an open collector type inverter element is used as the control element.